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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPLICANT: HENNHÖFER ET AL.

SERIAL NO.: 09/032,305 EXAMINER: R. KUNEMUND

FILED: FEBRUARY 27, 1998 GROUP: 1765

TITLE: PROCESS FOR TREATING A POLISHED SEMICONDUCTOR  
WAFER IMMEDIATELY AFTER THE SEMICONDUCTOR WAFER  
HAS BEEN POLISHED

COVER LETTER ENCLOSING  
REPLY BRIEF

MAIL STOP APPEAL BRIEF PATENTS  
Commissioner for Patents  
P.O.BOX 1450  
Alexandria, VA 22313-1450

Dear Sir:

Enclosed herewith for filing is a Reply Brief, in triplicate, in response to the Examiner's Answer mail dated January 15, 2004.

It is believed that no fee is required for the filing of this Reply Brief.

However, if a fee should be required, the Commissioner of Patent and Trademarks is hereby authorized to charge any additional required fee, or to credit any overpayment, to Deposit Account No. 03- 2468.

Respectfully submitted,

HEINRICH HENNHÖFER ET AL.

By: Edward R. Freedman

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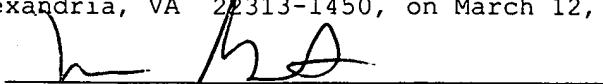
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Enclosures:

- 1) Brief in Triplicate

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on March 12, 2004.

  
Maria Guastella

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Dear Sir:

This is in response to the Examiner's Answer dated January 15, 2004.

In this Examiner's Answer, the Patent Examiner has contended several times that there is no teaching in the *Fabry* reference that a cleaning step after the polishing step is required in the reference. (Please see page 4 first paragraph and page 5 second paragraph of the Examiner's Answer).

In response to the Patent Examiner's contention that appellants are improperly limiting the scope of the *Fabry*

reference without any basis, the following is pointed out.

The Patent Examiner concedes, that a difference between the instant claims and the prior art which is represented by *Fabry et al.* is the timing of the oxidizing treatment. The Patent Examiner alleges that *Fabry et al.* do not teach a cleaning after the polishing as a mandatory process step. It is pointed out that *Fabry et al.* explicitly mention such a cleaning step. It is evident that *Fabry et al.* disclose a best mode of the process in the Example 1. Moreover, *Fabry et al.* do contribute to a specific timing for the oxidizing treatment. This is based upon the *Fabry* teaching in column 2 in lines 57 to 68 and specifically in column 2 in lines 61 and 62 that at least one polished wafer surface is "also washed and dried".

It is respectfully submitted that this teaching of "washing and drying" does in fact constitute a "cleaning step" set forth in the Specification of *Fabry*. Therefore this "cleaning step" in column 2 lines 61 to 62 of *Fabry* reinforces the importance of the "cleaning step" set forth in column 5 lines 59 to 67 of Example 1 of *Fabry*. In column 5 in line 62 of Example 1, *Fabry* teaches that the wafers "were first freed of polishing residues," which is a cleaning step corresponding to column 2 lines 61 to 62 of *Fabry*.

It must be respectfully emphasized that there is indeed more than one location in the *Fabry* reference wherein a "cleaning step" is mentioned. Again this "cleaning step" is described in column 2 in lines 61 and 62, as well as in *Fabry* column 5 in lines 59 to 67 and specifically in column 5 in lines 62. Hence it is clearly a proper interpretation of *Fabry* for the applicant to conclude that the intermediate "cleaning step" of *Fabry* is required and therefore has a major impact upon the timing of the *Fabry* process steps.

Therefore the conclusion of the Patent Examiner, that appellants are improperly limiting the scope of the *Fabry* reference without any basis, is respectfully submitted to be in error.

Moreover, it is not agreed with the Patent Examiner that the term "expeditently" (col. 2, lines 64-68) has any significance for the timing of the oxidizing treatment (which must happen according to the claimed invention immediately after removing the semiconductor wafer from the polishing plate).

This term "expeditently" is exclusively used in connection with an exposure of the polished wafer surface to organosilicon compounds. The exposure takes place subsequent to the oxidizing

treatment (col. 2, lines 64-66). Accordingly, the Patent Examiner refers to the timing of a process step which is not claimed in the present application and which is taught by *Fabry et al.* to be performed after the oxidizing treatment, i.e. at a time which is irrelevant for the timing of the oxidizing treatment. Therefore, *Fabry et al.* do not teach or suggest the claimed concept of "immediately after polishing" for the timing for the oxidizing treatment. This is because the terminology "expeditiously" does not relate to providing an oxidizing treatment. It is respectfully submitted to be improper to conclude this, since "washing and drying" occurs after polishing and before oxidizing in *Fabry*.

The Patent Examiner further argues that the reference *Lampert et al.* "is teaching to one of ordinary skill in the art to immediately oxidize the surface to prevent that the polished surfaces are damaged by dust particles and other compounds, which lead to a haze on the wafer surface". But the Examiner completely ignores what *Lampert et al.* mean by performing the oxidizing process step "directly on completion of the polishing step" (col. 3, lines 27-31).

As already stated in the Appeal Brief "directly on completion" according to *Lampert et al.* means "without

interrupting the polishing operation" (col. 4, lines 39-42) and "completing the polishing operation under oxidizing conditions" (col. 5, lines 4-7). Therefore, if one of ordinary skill in the art had modified the *Fabry et al.* reference by the teachings of the *Lampert et al.* reference, he would have performed the oxidizing treatment during the completing of the polishing operation and not in accordance with the claimed process (i.e. - immediately after removing the semiconductor wafer from the polishing plate). Hence, the claimed invention is not suggested by the above-discussed prior art references.

The *Hayashida* patent has no teaching as to when wafer oxidizing occurs relative to wafer polishing.

On Page 4 of the Reply Brief, the Patent Examiner has concluded that the Hennhöfer Declaration is not persuasive. This is respectfully traversed, for the following reasons.

The Patent Examiner contends that the Declaration is not over the closest prior art of record. Presumably the Patent Examiner believes that *Fabry* is the closest prior art of record; and that *Lampert* is not the closest prior art of record.

Specifically, the *Fabry* patent teaches that there is an intermediate cleaning step between the wafer polishing step and

the wafer oxidizing step. This is because *Fabry* teaches that the polished wafers were first freed of polishing residues and then oxidatively cleaned. Because *Fabry* adds this intermediate cleaning step, there can be no immediately oxidizing of the polished wafer. *Fabry* requires the addition of this extra intermediate cleaning step, which teaches away from the immediate oxidizing step of the claimed invention.

*Lampert* teaches adding an oxidizing agent at the end of the polishing step to the polishing agent flowing onto the workpiece surface. Thus *Lampert* discloses the simultaneous polishing and oxidizing of the wafer in a single combined step. This was shown by the Hennhöfer Declaration to cause a significant increase in the number of undesirable LPD's on the wafer surface, brought about by the *Lampert* teaching. The *Lampert* disclosure teaches away from the claimed sequential steps of polishing the wafer followed by immediately oxidizing the wafer.

Therefore, *Lampert* is the closest prior art document since *Lampert et al.* do not disclose removing the wafer from the polishing plate before the oxidizing treatment. In conclusion, this *Lampert* document clearly leads away from the present invention, which claims sequential polishing then oxidizing.

The Patent Examiner further contends that, the instant Specification teaches the same process as *Lampert*, oxidizing in the platte. In fact, during the history of this application this process was claimed. Further, the instant Specification does not teach a difference between oxidizing separately or in the same apparatus. Thus, the declaration is inconsistent with the instant Specification.

These contentions are respectfully traversed, because it is the claims on appeal, and NOT the Specification which are at issue when the prior art is applied. Each of the independent claims recite the process steps of

polishing the semiconductor wafer;

immediately after polishing the semiconductor wafer removing the semiconductor wafer from a polishing plate; and

immediately after removing the semiconductor wafer from the polishing plate, bringing the semiconductor wafer into contact with an aqueous treatment agent solution for oxidizing a polished surface of the semiconductor wafer by action of the aqueous treatment agent solution.

CONCLUSIONS

In view of all the reasons set forth above, all the claims must be considered as being non-obvious under 35 U.S.C. 103 with respect to the prior art applied by the Patent Examiner. Reversal of this ground of rejection is respectfully requested.

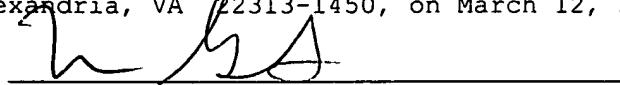
Respectfully submitted,

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